REMARKS/ARGUMENTS

This application has been reconsidered carefully in light of the Final Office Action dated as mailed on 20 October 2005. A careful reconsideration of the application by the Examiner in light of the foregoing amendments and the following remarks is respectfully requested.

This response is timely filed as it is filed within the three (3) month shortened statutory period for response to the outstanding Office Action.

No additional claim fee is believed due as a result of this Amendment because neither the total number of pending claims nor the number of pending independent claims is believed to exceed the total number and the number of independent claims, respectively, for which fees have previously been paid. If, however, it is determined that such a fee is properly due as a result of this communication, the Commissioner is hereby authorized to charge payment of such fees or credit any overpayment, associated with this communication, to Deposit Account 19-3550.

Amendment to the Claims

By the above,

1. claims 1-28 have been canceled without prejudice and
2. claims 29-56 have been added to more fully and completely claim the disclosed subject matter.

The newly added claims add no new subject matter and find support throughout the originally filed application. For example, newly added independent claims 29, 47 and 54 find general support at page 15, line 17 through page 25, line 14 and page 26, line 3 through 14, for example, with claims 29, 47 and 54 finding additional specific support at page 8, line 13 through page 10, line 21; page 11, line 9 through page 13, line 10; and page 13, line 11 through page 14, line 17, respectively.

Newly added claims 30-46 generally parallel originally filed claims 2-18, respectively, but are now dependent on newly added independent claim 29. Newly added claim 48 finds more specific support such as at page 22, line 12 through page 13, line 4, for

example. Newly added claims 49 and 50 find more specific support such as at page 17, line 3 through page 18, line 5, for example. Newly added claims 51 and 52 find more specific support such as at page 19, line 9 through line 20, for example. Newly added claim 53 finds more specific support such as at page 24, line 16 through page 25, line 14, for example. Newly added claim 55 finds more specific support such as at page 19, line 9 through line 20 and page 24, line 16 through page 25, line 14, for example.

Support for claim 56 requiring that the supply of the first gas-generating pyrotechnic material have a burn duration during the dual stage combustion different than a burn duration of the supply of the first gas-generating pyrotechnic material during the single stage combustion can also be found throughout the originally filed application. For example, as set forth at page 19, lines 9-20, the orifice 45 serves to throttle a single stage combustion wherein the supply of the first gas-generating pyrotechnic material 40 is selectively reacted to produce a first combustion chamber single stage combustion product gas. That is, in the event of such a single stage combustion, the orifice 45 is a controlling orifice. During such single stage combustion, a relatively low combustion pressure is developed within the first combustion chamber 30 and the first gas-generating pyrotechnic material 40 has a burn time or duration of at least about 60 msec and, preferably, a burn time or duration of about 80 msec during such a single stage combustion. (See page 19, lines 17-20, for example.) However, as set forth beginning at page 24, line 16, during a dual stage combustion the diffuser orifices 18 now throttle the combustion of at least a portion of the supply of the first gas-generating pyrotechnic material 40, wherein at least a portion of the supply of the first gas-generating pyrotechnic material 40 reacts to produce a first combustion chamber dual stage combustion product gas. During the dual stage combustion, the first gas-generating pyrotechnic material 40 has a relatively high combustion pressure and the first gas-generating pyrotechnic material 40 has a burn time or duration of less than about 60 msec during the dual stage combustion. (See page 25, lines 4-5, for example.)

Claims 29-56 remain in the application.

SUMMARY OF EXAMINER INTERVIEW

As a preliminary matter, the undersigned wishes to thank Examiner Spisich for the many courtesies extended during the above-identified telephonic interview.

Matters discussed in the referenced interview included: the rejection of certain of the claims (e.g., claim 1) as being unpatentable with particular emphasis on differences in structure and operation between the inflator device of the claimed invention and the gas generator shown and described in U.S. Patent 5,970,880 to Perotto (hereinafter "Perotto"). As briefly discussed during the telephone interview, during a single stage combustion of the supply of the first gas-generating pyrotechnic material, the first combustion chamber orifice is controlling orifice for the flow of the first combustion chamber single stage combustion product gas from the inflator device. However, during a dual stage combustion, the diffuser exit area controls the flow of the product gas from the inflator device.

Specific reference was made to the passage of the application appearing at page 26, lines 3-14, which specifically provides that in accordance with a preferred embodiment, with both the first and the second combustion chambers operating, the combined inflation fluid flow is sufficiently great as to overwhelm the diffuser exit area (e.g., the diffuser orifices). As a result, the flow choke point or throttling orifice area is effectively relocated or moved from the exit areas or orifices of each of the combustion chambers, respectively, to the diffuser exit area (e.g., the diffuser orifices) and such that the net operating pressure within the inflator device is controllably increased. Further, as the internal combustion pressure within the inflator device, and hence within the first combustion chamber increases, the burn rate of the supply of the first gas-generating pyrotechnic material increases due to the increased internal combustion pressure and the first gas-generating pyrotechnic material high burn rate pressure exponent.

No agreement was reached with regard to the possible amendment of the claims such as to place the claims in condition for allowance.

Claim Rejections - 35 U.S.C. §103

Claims 1-28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Perotto in view of U.S. Patent 6,139,055 to Dahl et al. (hereinafter "Dahl") and further in view of U.S. Patent 6,598,901 to Nakashima et al. (hereinafter "Nakashima").

The Action alleges that it "would have been obvious to one of ordinary skill in the art at the time the invention was made to use materials having the characteristics as claimed in the dual stage inflator as disclosed by Perotto, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice." The Action further alleges that Nakashima discloses that "it is known in the art to vary the materials as previously discussed to optimize the operating characteristics of the inflator."

Such rejections are moot in view of the above cancellation of claims 1-28.

Newly Added Claims

Claims 29-56 have been added to more fully and completely claim the disclosed subject matter.

Claim 29 is an independent claim and is directed to an inflator device. Newly added claims 30-46 are directly or indirectly dependent on claim 29.

The inflator device of claim 29 comprises a diffuser chamber. The diffuser chamber includes a plurality of diffuser orifices forming a diffuser exit area for flow of product gas from the inflator device. The inflator device also includes a first combustion chamber connected to the diffuser chamber. The first combustion chamber has a first combustion chamber exit area comprising a first orifice and providing independent fluidic communication between the first combustion chamber and the diffuser chamber. A supply of a first gas-generating pyrotechnic material having a burn rate that is pressure dependent is contained within the first combustion chamber and wherein at least a portion of the supply of the first gas-generating pyrotechnic material is reactable. The first gas-generating

pyrotechnic material has a burn rate pressure dependency of at least about 0.55, where the burn rate pressure dependency is represented by n in a burn rate expression:

$$r_b = k(P)^n$$

where r_b is the burn rate of the first gas-generating pyrotechnic material, k is a constant, P is a combustion pressure, and n is a slope of a linear regression line drawn through a log-log plot of burn rate versus pressure. The inflator device also includes a second combustion chamber connected to the diffuser chamber. The second combustion chamber has a second combustion chamber exit area comprising a second orifice and providing independent fluidic communication between the second combustion chamber and the diffuser chamber. A supply of a second gas-generating pyrotechnic material is contained within the second combustion chamber and wherein at least a portion of the supply of the second gas-generating pyrotechnic material is reactable.

During a single stage combustion of the supply of the first gas-generating pyrotechnic material, the supply of the first gas-generating pyrotechnic material is selectively reactable to produce a first combustion chamber single stage combustion product gas and the first orifice is controlling orifice for the flow of the first combustion chamber single stage combustion product gas from the inflator device.

During a single stage combustion of the supply of the second gas-generating pyrotechnic material, the supply of the second gas-generating pyrotechnic material is selectively reactable to produce a second combustion chamber single stage combustion product gas and the second orifice is controlling orifice for the flow of the second combustion chamber single stage combustion product gas from the inflator device.

During a dual stage combustion, the supply of the first gas-generating pyrotechnic material is reactable to produce a first combustion chamber dual stage combustion product gas and the supply of the second gas-generating pyrotechnic material is reactable to produce a second combustion chamber dual stage combustion product gas. Also, the diffuser exit area controls the flow of the first combustion chamber dual stage

combustion product gas and the flow of the second combustion chamber dual stage combustion product gas from the inflator device whereby internal combustion pressure within both the inflator device and the first combustion chamber increases and the burn rate of the supply of the first gas-generating pyrotechnic material increases.

Claim 47 is also an independent claim directed to an inflator device, with claims 48-53 directly or indirectly dependent thereon.

The inflator device of claim 47 further includes a first combustion chamber exit area including at least one first orifice and a second combustion chamber exit area including at least one second orifice. The inflator device of claim 47 also includes a first initiator in discharge communication with the first combustion chamber and in operational initiation communication with the supply of the first gas-generating pyrotechnic material. The first initiator selectively initiates reaction of the supply of the first gas-generating pyrotechnic material in one of a single stage combustion and a dual stage combustion. The inflator device of claim 47 further includes a second initiator in discharge communication with the second combustion chamber and in operational initiation communication with the supply of the second gas-generating pyrotechnic material. The second initiator selectively initiates reaction of the supply of second gas-generating pyrotechnic material in one of the single stage combustion and the dual stage combustion.

Claim 54 is an independent claim and is directed to a combination of an inflator device, similar to that claimed in claim 29 and a control assembly in operational control communication with the inflator device. Newly added claims 55 and 56 are directly or indirectly dependent on claim 54.

As required by the claims and discussed in the specification, during a single stage combustion of the supply of the first gas-generating pyrotechnic material, the supply of the first gas-generating pyrotechnic material is selectively reactable to produce a first combustion chamber single stage combustion product gas with the first orifice being controlling orifice for the flow of the first combustion chamber single stage combustion product gas from the inflator device. During a dual stage combustion, however, the supply

of the first gas-generating pyrotechnic material is reactable to produce a first combustion chamber dual stage combustion product gas and the supply of the second gas-generating pyrotechnic material is reactable to produce a second combustion chamber dual stage combustion product gas. With such dual stage combustion, the diffuser exit area controls the flow of the first combustion chamber dual stage combustion product gas and the flow of the second combustion chamber dual stage combustion product gas from the inflator device whereby internal combustion pressure within both the inflator device and the first combustion chamber increases and the burn rate of the supply of the first gas-generating pyrotechnic material increases.

It is respectively submitted that such inflator devices and combinations are neither shown nor suggested by the prior art of record or, more specifically, by Perotto, Dahl and/or Nakashima, alone or in combination.

For example, while the Action alleges that Perotto discloses a plurality of diffuser orifices formed in the diffuser chamber and with these diffuser orifices "throttling" a dual stage combustion, it is respectively submitted that Perotto, neither alone nor in combination with the other cited prior art, show or suggest diffuser exit area control of the flow of the first combustion chamber dual stage combustion product gas and the flow of the second combustion chamber dual stage combustion product gas from an inflator device whereby internal combustion pressure within both the inflator device and the first combustion chamber increases and the burn rate of the supply of the first gas-generating pyrotechnic material increases, as required by the claimed invention. For example, as discussed during the above-identified telephone interview, the cross sectional view (FIG. 1) of the gas generator structure shown in Perotto, includes eight (8) holes "9" in the intermediate part "8". This intermediate part generally corresponds to the claimed diffuser chamber. This gas generator structure of Perotto is nowhere described, shown or suggested to have or provide a diffuser exit area for the flow of product gas from the inflator device and which diffuser exit area controls the flow of the first combustion chamber dual stage

combustion product gas and the flow of the second combustion chamber dual stage combustion product gas from the inflator device whereby internal combustion pressure within both the inflator device and the first combustion chamber **increases** and the burn rate of the supply of the first gas-generating pyrotechnic material **increases**, as required by the claimed invention.

Conclusion

In view of the above, all pending claims are believed to be in condition for allowance and notification to that effect is solicited. However, should the Examiner detect any remaining issue or have any question, the Examiner is kindly requested to contact the undersigned, preferably by telephone, in an effort to expedite examination of the application.

Respectfully submitted,

Nick C. Kottis
Registration No. 31,974

Pauley Petersen & Erickson
2800 West Higgins Road; Suite 365
Hoffman Estates, Illinois 60195
TEL (847) 490-1400
FAX (847) 490-1403